

Philip J. Daum

PE
Principal



Mr. Daum is a Principal at Engineering Systems Inc. (ESI) who specializes in mechanical engineering, research, development, and experimental testing. He has conducted complex, multidisciplinary research and accident investigations pertaining to freight and transit railroads, cargo and portable tanks, transportation equipment systems and components, and hazardous materials. His evaluations include the areas of reliability, durability, crashworthiness, security performance and regulatory compliance. His 39 years of industrial experience includes design of railroad rolling stock, truck/bogies, brakes, draft systems, valves, pressure relief devices, safety equipment, and operating components/systems. He is also experienced in technology evaluations, intellectual property analysis, equipment qualification, health monitoring, and maintenance.

Education

B.S., Mechanical Engineering, University of Illinois at Urbana-Champaign, 1981

A.S., Engineering, Moraine Valley Community College, Palos Hills, IL, 1978

Cooperative Work-Education Program

David W. Taylor Naval Ship R. & D. Center, Bethesda, MD, 1979–1980

Continental Can Corporation, Chicago, IL, 1978.

Licensed & Certifications

- State of Illinois - License No. 062-045260
- State of California - License No. M-37660 - Retired Professional Engineer

Positions Held

Engineering Systems Inc., Aurora, IL

- Principal, August 2014 – Present
- Director of Rail 2018 – 2022

Contact Information

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ESi Aurora

4215 Campus Drive
Aurora, IL 60504

Areas of Specialization

- Freight and transit cars
- Pressure relief devices
- Hazardous materials transportation
- Valves and fittings
- Transportation security
- Railroad wheels, axles and bearings
- Transportation accident investigations
- Castings and machined components
- Railroad safety appliances
- Railroad draft systems
- Braking systems
- Railroad rolling stock
- FELA
- Cargo and portable tanks
- Accident reconstruction
- Failure Analysis

- Senior Managing Consultant, 2010 – July 2014
- Senior Consultant, 2006 – 2010

Union Tank Car Company, East Chicago, Indiana

- Director of Engineering, 1998 – 2006
- Chief Product Engineer, 1991 – 1998
- Product Engineer, 1987 – 1991
- Project Engineer, 1984 – 1987

General Electric Railcar Services Corporation, Chicago, Illinois

(Originally North American Car Corporation)

- Mechanical Engineer, 1981 – 1984

Continuing Education

- **University of Illinois RailTEC William Hay Railroad Engineering Seminars**, 2006 – Present
- **Metra Mental Health Awareness Symposium, Suicide Prevention and Railroad Safety** – October 2019
- **FARO Focus 3D Scanner**, Certified Technician, FARO Technologies – June 2015
- **Traffic Crash Reconstruction**, Northwestern University Center for Public Safety, Ann Arbor, MI, January 2015
- **Vehicle Crash Reconstruction Methods**, Society of Automotive Engineers, Troy, MI – December 2014
- **U.S. Department of Homeland Security, Transportation Security Administration (DHS-TSA) SECRET, Clearance** – 2012 – 2020
- **Union Pacific Derailment Investigation Course** – October 2011
- **NTSB Accident Investigation Orientation for Rail Professionals** – July 2011
- **Department of Homeland Security (DHS) Toxic Inhalation Hazard (TIH) release and dispersion tests; Dugway, UT** – Invited Guest 2010
- **ASME Joint Rail Conferences, Annual Technical Conferences** – 2006 – 2010
- **ASME Rail Transportation Division (RTD) Fall Technical Conferences** – 2006 – 2010
- **ASSE Hazard Recognition for the Field Employee** – February 2010
- **FMCSA National Truck and Bus Crash Picture Webinar** – February 2011
- **University of Illinois Railroad Environmental Conference** – 2006, 2007, 2008, 2009
- **BNSF Derailment Analysis and Prevention Workshop** – May 2007

- **40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training for Initial Site Workers (29CFR 1910.120) – 2006**
 - **Derailment Investigation and Prevention Seminar, Sponsored by the American Association of Railroad Superintendents – November 2006**
 - **Powered Industrial Truck Operator Safety Training Certified – 2012 - Present**
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Professional Affiliations/Honors

Transportation Research Board (TRB)

- Committee for Review of the Federal Railroad Administration's (FRA's) Research and Development (R&D) Program, 2019 – 2020
- Committee on the Review of Department of Transportation Testing of Electronically Controlled Pneumatic (ECP) Brakes, Transportation Research Board, National Academies of Sciences, Engineering, and Medicine, 2016 – 2017
- Contributed at briefings for Department of Transportation and U.S. Congressional Staff, February and October 2017
- Member, Committee on Transportation of Hazardous Materials (AT040), 2006 – 2015
- Associate Member, Railroad Operational Safety Committee, 2007 – 2020
- TRB Human Factors Conference: Safety Culture Measurement, January 2016
- Peer Reviewer, U.S. Department of Transportation, Federal Railroad Administration (DOT-FRA) Research Review, Hosted by TRB, 2009, 2011, & 2012
- Peer Reviewer, TRB Technical Papers, 2009 & 2010
- Human Factors Implementation – Workshop, January 2009
- Transportation of Renewable Fuels: Risk and Preparedness in a Changing World, Co- organizer, January 2009
- Rail Hazmat Safety and Security: Research, Modeling, and Testing, Co-chairman, January 2008
- Proactive Risk Management Safety Approaches for Managing Human Factors Caused Accidents in the Railroad Industry – Workshop, January 2007
- Workshop for the U.S. Government Accounting Office (GAO) evaluation of security measures for hazmat transportation by rail, Invited tank car subject matter expert, June 2002

National Transportation Safety Board (NTSB)

- Invited member of various ad hoc investigative teams, including crude-by-rail derailment investigations
- Coordinated a meeting between the National Transportation Safety Board (NTSB) and the RSI- AAR Tank Car Safety Project (Safety Project) oversight committee that led to a Memorandum of Understanding

whereby NTSB invited the Safety Project to become a Party to certain future NTSB rail accident investigations, with ESI participating on behalf of the Safety Project, January 2014

Transportation Safety Board of Canada (TSB)

- Invited subject matter expert for crude-by-rail derailment investigations, including Lac-Mégantic

Advanced Tank Car Collaborative Research Program (ATCCRP)

- Coordinated the development and implementation of the initial 5-year research and development plan
- Technical Advisor, 2010 – 2012
- Program Director, 2009 – 2010

Next Generation Railroad Tank Car Project (NGRTC)

- Lead Contractor – Design & Construction, 2007 – 2008
- Member, External Advisory Panel, 2006 – 2007

Society of Automotive Engineers (SAE International)

- Member, 2014 – Present

American Society of Mechanical Engineers (ASME)

- Rail Transportation Division (RTD) Assistant Technical Program Chair, 2010
- Member of Rail Transportation Division (RTD), 2006 – Present
- Peer Reviewer, ASME-RTD Technical papers, 2008 – 2010
- Member of the Section XII Committee on Continuing Qualification Requirements for Transportation Containers, 1999 – 2001

Chicago Railroad Superintendents Association (CRSA)

- Member, 2007 – 2019

American Short Line & Regional Railroad Association (ASLRRA)

- Member, 2007 – Present

American Railway Engineering and Maintenance-of-Way Association (AREMA)

- Member, 2006 – Present

Association of American Railroads (AAR) Tank Car Committee (TCC)

- Member of Executive Committee, 1998 – 2006
- Chairman of the Material & Design (M/GD&E) Working Group, 1999 – 2001
- Chairman of the Tank Car Qualification Guidelines Task Force, December 2000. Coordinated an industry-wide workshop which resolved significant issues with new federal maintenance planning rules

- Liaison to the AAR Hazardous Material Working Group, 1999

AAR's Hazardous Material Critical Action Team

- Contributed to the development of the hazmat portion of the AAR's National Security Management Plan
- Charter member – tank car design subject matter expert, October 2001 – 2004

Railway Supply Institute (RSI) Engineering & Technical Subcommittee

- Member, 1995 – 2006
- Chairman, 2001 – 2002

Chlorine Institute (CI)

- Hydrochloric Acid Rubber Lining Condition Monitoring Task Group,
- Ex-officio member, 2008 – 2014
- Chairman, 2006 – 2008
- Chairman, Tank Car Subcommittee, 2004 – 2006; Vice-Chairman, 2000 – 2004
- Member, 1998 – 2008
- Invited speaker at special session on future chlorine tank car specifications, Atlanta, GA, 2005

Side Bearing Testing Consortium

- Chairman, 2003 – 2005

American Association of Railroad Superintendents (AARS)

- Member, 2006 – 2008

American Petroleum Institute (API) Railroad Transportation Committee

- Member, 2001 – 2006

Publications

“Assessment Best Practices - Tank Car Damage,” Contributors: Hazardous Materials Committee of the Association of American Railroads (HMC-AAR), May 2021.

TRANSCAER 2020 “Seconds Count” Video Series, “Rapid Scene Size-Up (Tank Cars),” Invited subject-matter-expert co-author, CHEMTREC®, TRANSCAER®, American Chemistry Council, January – December 2020.

“Review of the Federal Railroad Administration’s Research and Development Program, Transportation Research Board Special Report 334,” a Consensus Study Report of the National Academies of Sciences, Engineering, and Medicine, December 2020.

“A Review of the Department of Transportation’s Testing and Analysis Results for Electronically Controlled Pneumatic Brakes: Letter Report (Phase 2),” Contributors: Committee on the Review of the Department of

Transportation Testing of Electronically Controlled Pneumatic (ECP) Brakes; Policy Studies; Studies and Special Programs Division; Transportation Research Board; National Academies of Sciences, Engineering, and Medicine, October 5, 2017, <http://www.trb.org/main/blurbs/176644.aspx>.

“A Review of the Department of Transportation Plan for Analyzing and Testing Electronically Controlled Pneumatic Brakes,” Contributors: Committee on the Review of Department of Transportation Testing of Electronically Controlled Pneumatic (ECP) Brakes; Policy Studies; Transportation Research Board; National Academies of Sciences, Engineering, and Medicine, February 17, 2017, <http://www.trb.org/Main/Blurbs/175476.aspx>.

“Energy Transportation Safety on the Rails: Historical Perspectives on Applied and Cooperative Research,” article in TR News 298, June-July-August 2015, <http://www.trb.org/Main/Blurbs/173066.aspx>.

“Feasibility Study for Highway Hazardous Materials Bulk Package Accident Performance Data Collection,” HMCRP Report 10: Transportation Research Board of the National Academies, Washington, D.C., 2013, www.trb.org/HMCRP/Blurbs/168492.aspx.

Presentations

Tank Car Damage Assessment Guidelines, Security and Emergency Response Training Center (SERTC) Teach-Back Session, January 2022.

Tank Car Damage Assessment Guidelines, Union Pacific Railroad Hazardous Materials Department, October 2021.

Toxic Tort Litigation Issues, Benjamin R. Slater III, Esq., Robert A. Wells, and Philip J. Daum, NARTC, La Jolla, CA, 2017.

Lessons from the Field — Risk Assessment, RSA Rail Forum, RSA Rotterdam and London Offices, September 2015.

Crude by Rail Safety, Chicago Railroad Superintendent Association, October 2014.

Visual Data: 3-Dimensional Laser Scanning, Global Level Crossing Symposium, Champaign, IL August 2014.

Scene Preservation for Future Safety, American Short Line and Regional Railroad Association, Annual Meeting, Mechanical breakout Session, San Diego, CA, April 2014.

Scene Freeze-Frame in 3-D, AREMA Student Chapter, University of Illinois, Champaign, IL, January 2014.

RSI-AAR Tank Car Safety Project, Lac-Mégantic, Quebec, Investigation, Factual Information Meeting at Transportation Safety Board of Canada’s Engineering Laboratory, Ottawa, Ontario, December 2013.

Damage Assessment Task Force, Norfolk Southern Damage Assessment Class, Charlotte, NC, November 2013.

Scene Freeze-Frame in 3-D, Association of American Railroads General Claims Conference, Palm Beach, FL, October 2013.

“Advanced Tank Car Collaborative Research Program,” Chlorine Institute meetings, Charlotte, NC, October 2009 and New Orleans, LA, March 2010.

“Rubber Lining Condition Monitoring Test Results,” Chlorine Institute Hydrochloric Acid Forum, New Orleans, LA, March 2010 and Nashville, TN, September 2010.

“The Initial Forensic Investigation,” American Short Line and Regional Railroad Association (ASLRRA) Liability Seminar, Boston, MA, July 2009.

“Preventing Release – Improved Puncture Resistance of Hazardous Materials Tank Cars,” University of Illinois Railroad Environmental Conference, November 2008.

“Hydrochloric Acid Rubber Failure Analysis,” Chlorine Institute Fall Meeting, Broomfield, CO, September 2008.

“Hydrochloric Acid Rubber Lining Condition Monitoring,” Presentation at the Chlorine Institute Hydrochloric Acid Forum, Houston, TX, March 2007.

“Tank Car Journal Bearing Investigation,” Presentation at the Chlorine Institute Tank Car Forum, Houston, TX, March 2007.

“Chlorine Tank Car,” Chlorine Institute’s Fall Meeting, Atlanta, GA, September 2005.

“Tank Car and Fittings Design,” Training course and tour of production facilities for Class 1 Railroad Emergency Response Teams.

Union Pacific Railroad Company, 2005 (two sessions)

BNSF, 2003

CSX Transportation, 2000, 2001

Norfolk Southern Corporation, 2004

AAR Transportation Technology Center Inc. (TTCI) Hazmat Instructors, 1999

Patents

- Combination Bottom Outlet Saddle and Sump, U.S. Patent No. 4,892,042, issued 1990, Canadian Registration No. 1,310,542, issued 1992